UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF COMMERCIAL FISHERIES

# CALIFORNIA FISHERY MARKET NEWS MONTHLY SUMMARY

## August 1964

## Part II–Fishing Information*

Sea-surface temperatures, fishing and research information of interest to the West Coast tuna-fishing industry and marine scientists

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San Diego 6, California

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# BLUEFIN TUNA TAGGING IN 1963 - A PRELIMINARY REPORT

by
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and
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## INTRODUCTION

In 1963, the bluefin tuna, Thunnus thynnus (Linnaeus), yielded the third highest total California domestic landings since 1919 (15,177 tons). The highest landings on record were made in 1962 (15,600 tons), with 1958 nearly equalling 1962 (15,360 tons).

The 1963 bluefin tuna landings reflected, as in 1962, heightened interest in the fishery by high-seas purse seiners. Yellowfin tuna landings declined during the normal summer slack period, and again, almost all of the high-seas purse seine fleet made at least one bluefin trip to the local fishing banks. Also as in 1962, fishing effort reflected a severalfold increase over the previous years of record.

The cooperative long-range bluefin tuna-tagging program, which was started by the U.S. Bureau of Commercial Fisheries and California Department of Fish and Game in 1962, was continued in 1963. The purse seiner Elsinore, operating under charter to the U.S. Bureau of Commercial Fisheries, made a trip to the Baja California offshore waters from July 16 to August 24, 1963. On this cruise, 543 bluefin were tagged and released between July 19 and August 19.

Additional tag releases were made through the cooperation of the Mission Bay Research Foundation of San Diego. One hundred bluefin were tagged and released in the period August 13-September 26 by the Foundation vessel Dorsal.

Prior to the 1963 tagging cruises, 1,146 bluefin tuna had been tagged in the eastern Pacific Ocean. Of this total 960 were tagged in 1962 (Flittner and Iselin, 1963), 121 were tagged in 1958 (Chatwin and Orange, 1960), and 64 were tagged on occasion between 1953 and 1956 (Iselin, MS.). One bluefin was marked with a Fish Commission of Oregon tag by personnel aboard M/V John Cobb in July, 1961 (Meehan, personal communication).

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[2/] California Department of Fish and Game, Terminal Island.

Of the 186 bluefin released prior to 1962, 9 tags of the 121 released in 1958 by Inter-American Tropical Tuna Commission personnel have been recovered. Eight tags were recovered within one year of release from the Guadalupe-San Clemente Island region, and the ninth tag was recovered in April of last year by a Japanese longline vessel fishing just north of the Bonin Islands off Japan (Chatwin and Orange, 1960; Orange and Fink, 1963). The Fish Commission of Oregon bluefin tag was released 105 miles west of Brookings, Oregon and was recovered 339 days later off Lusitania Bank, Baja California, Mexico. This fish had grown approximately 9.5 centimeters and had traversed an estimated minimum distance of 1150 miles to the south. Of the California Department of Fish and Game releases in 1953 through 1956, 3 tags have been recovered. All were short-term recoveries from the Guadalupe-San Clemente Island area (Clemens, personal communication).

Recovery data for the cooperative tagging program in 1962 have been summarized in another publication (Flittner and Iselin, 1963).

## 1963 Tagging Operations

Elsinore first sighted bluefin tuna on July 19, about 30 miles southwest of Turtle Bay, Baja California. Subsequently, seven successful sets were made between Turtle Bay and the 43-fathom spot east of San Clemente Island; the last release was made on August 19 at this location.

Of particular interest this year was the difficulty which Elsinore and other purse seiners experienced in successfully stopping schools of bluefin tuna after they were surrounded by the net. Of 33 net sets made by Elsinore on schools known to be bluefin tuna, only seven were successful in retaining them until the purse rings were hoisted aboard. Bluefin schools were large, especially in the southern area of the fishery, and the fish were found in very clear water. Schools appeared exceedingly wary, and turned away from Elsinore upon approach, occasionally necessitating large towline distances by the time the boat returned to the skiff when setting the net. Even after the towline was hauled and the fish were still inside the net, more than half of the schools were lost as the fish sounded beneath the leadline during pursing operations.

Tagging procedures were essentially the same as last year. During the tagging operation, fish were measured on a polyurethane foam pad marked off in 5-centimeter intervals. As in 1962, tagging proceeded as long as fish condition permitted. Almost all fish suffered net marks,

loss of scales, frayed fins, and bruises to some degree. The surprisingly high tag returns seem to indicate the relative hardiness of the bluefin subsequent to handling and release. Superficial marks and the tag wounds appeared to heal rapidly after release; fish returned in periods as short as two weeks were reported as fully recovered (or nearly so) by dock contact personnel.

An experimental tagging project aboard the Mission Bay Research Foundation vessel Dorsal proved successful. Dorsal operated among the purse seine boats on August 13, tagging and releasing 73 fish from a purse seine set by Southern Queen and 24 fish from a set made by Santa Isabella. The other three bluefin tagged were taken by hook and line.

## RETURN DATA

Seventy-nine tags had been returned by January 1, 1964. These recoveries represent the return of 12.3 percent of the fish released (table 1). This is an increase of 3.5 percent over the number returned during the same period in 1962. Percentages varied from 2.7 to 25.0 percent of the individual release groups (excluding the three single-tag releases).

The most noteworthy feature of these tag returns is shown in figure 1. Release groups 1 and 2 moved appreciable distances northward in a relatively short period of time; 18 tags were recovered within 60 days after their release off San Pablo Bay. One bluefin in group 2 travelled 259 miles to the north in 20 days, averaging 13 miles per day. The average movement of this group (12 recoveries) was slightly over 7 miles per day at liberty. Another fish in the same group moved 330 miles to the north before being recaptured 50 days later.

During the charter cruise, Elsinore's fishing experience appeared to substantiate indications of bluefin movement as revealed by the 1962 tag returns (Flittner and Iselin, 1963). Fishing activity for bluefin off San Pablo Bay commenced about July 18 and terminated about July 27-28. During this interval, the bluefin appeared to become increasingly elusive, and the relative number of breezing schools sighted each day declined steadily. On July 27, Elsinore elected to scout for bluefin farther to the north and east of Guadalupe Island. For the next 3 days, Elsinore steamed on a search pattern designed to transect the narrow zone of 66-68°F. water developing at that time (figure 2). During this reconnaisance trip, only one school was sighted but was not positively identified as to species. Elsinore returned to the area off Turtle Bay and made 3 unsuccessful sets on bluefin schools late in the afternoon

Table 1.--Release and recovery data for 643 bluefin tuna tagged in 1963.

[Period ending January 1, 1964.]

| Release number and location | Date | Time (PST)[1] | Sea temperature (°F) | Number of fish | | Percent recovered | Time at liberty (days) | | | Distance travelled | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Tagged | Recovered | | Maximum | Minimum | Average | Maximum | Minimum | Av |
| 1 (27°10'N.,115°10'W.) | July 19 | 1734-1755 | 70.7 | 76 | 5 | 6.6 | 60 | 8 | 29.4 | 286 | 7 | |
| 2 (27°14'N.,115°32'W.) | July 26 | 1555-1745 | 68.4 | 112 | 13 | 11.6 | 54 | 20 | 43.9 | 361 | 247 | |
| 3 (30°43'N.,117°43'W.) | August 10 | 1330-1650 | 66.8 | 55 | 4 | 7.3 | 46 | 19 | 32.8 | 106 | 75 | |
| 4 (30°27'N.,117°47'W.) | August 10 | 2110-2310 | 66.2 | 77 | 5 | 6.5 | 42 | 4 | 16.0 | 133 | 31 | |
| 5 (31°03'N.,117°35'W.) | August 11 | 1050-1350 | 66.8 | 122 | [3]/ 17 | 13.9 | 57 | 3 | 28.3 | 107 | 8 | |
| 6 (32°10'N.,117°52'W.) | August 12 | 0655-1000 | 66.2 | 37 | [2]/ 2 | 5.4 | - | - | 22.0 | - | - | |
| 7 (32°03'N.,118°13'W.) | August 13 | - | 68.0 | 24 | 1 | 4.2 | - | - | 21.0 | - | - | |
| 8 (32°03'N.,118°19'W.) | August 13 | - | - | 1 | 0 | - | - | - | - | - | - | |
| 9 (32°07'N.,118°08'W.) | August 13 | - | - | 73 | 17 | 23.3 | 49 | 6 | 22.2 | 45 | 5 | |
| 10 (32°48'N.,118°03'W.) | August 19 | 1400-1655 | 69.8 | 64 | 15 | 23.4 | 33 | 3 | 13.9 | 144 | 37 | |
| 11 (31°59'N.,118°13'W.) | September 25 | 1115 | 68.0 | 1 | 0 | - | - | - | - | - | - | |
| 12 (32°08'N.,118°26'W.) | September 26 | 1330 | 68.9 | 1 | 0 | - | - | - | - | - | - | |
| Totals | -- | -- | -- | 643 | 79 | 12.3 | 60 | 3 | 26.1 | 361 | 5 | |

[1]/ Times at start and finish of tagging, Pacific Standard Time (PST).
[2]/ Data incomplete for one return.
[3]/ Data incomplete for two returns.

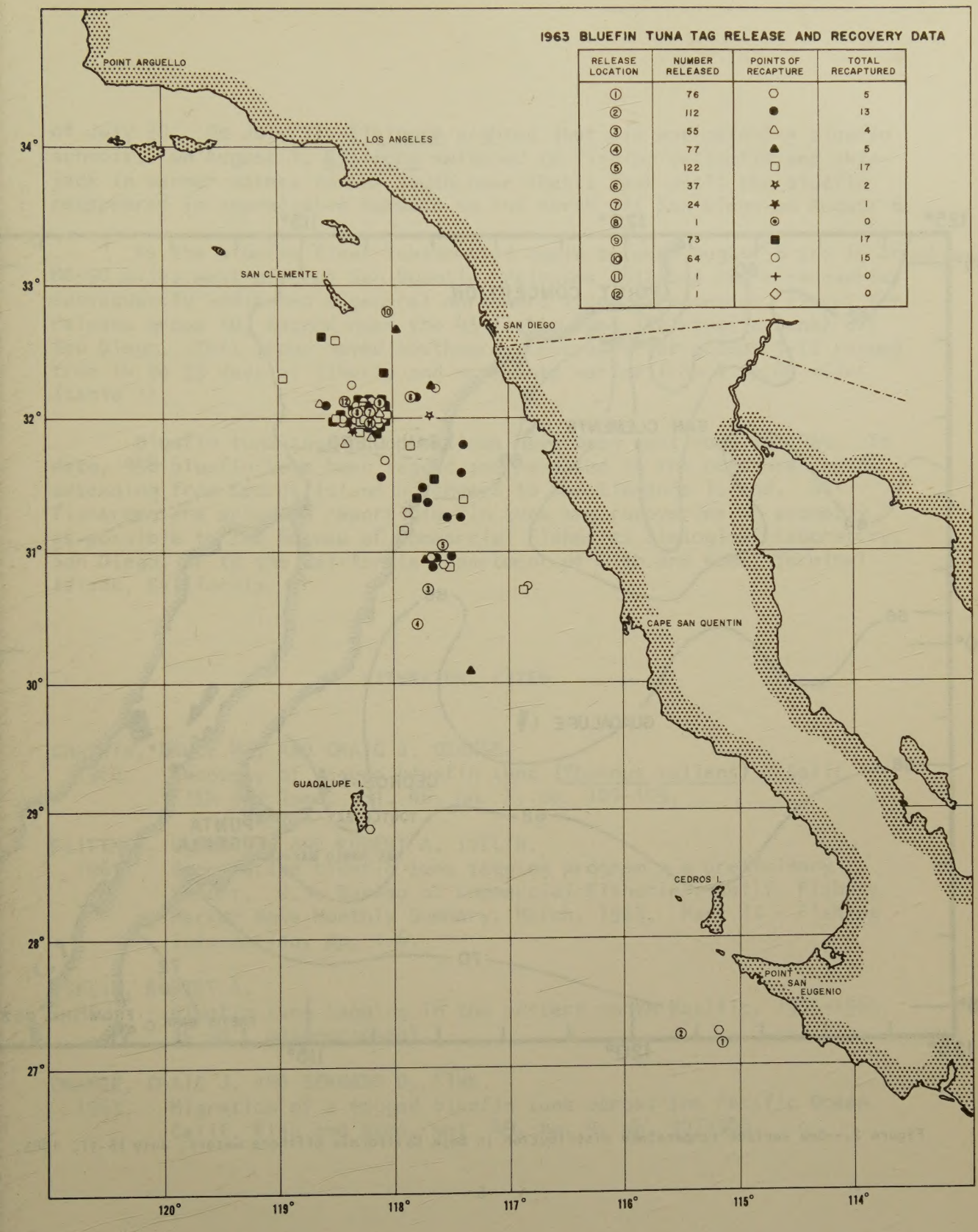


Figure 1.--Dispersal of bluefin tuna tagged and released July 19-September 26, 1963, off the California-Baja California coast. (Tag returns summarized to January 1, 1964.)

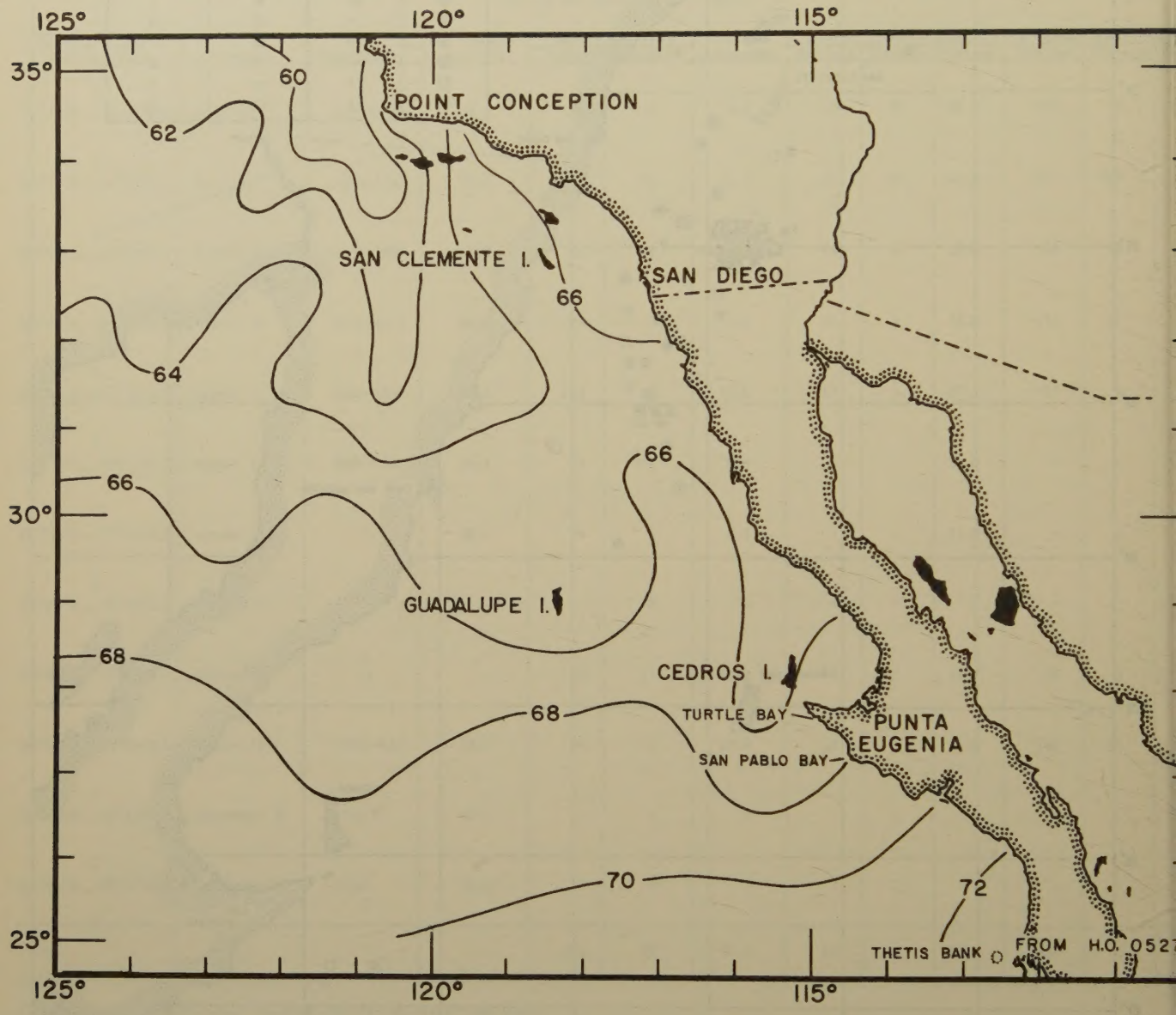


Figure 2.--Sea surface temperature distribution in Baja California offshore waters, July 16-31, 1963.

of July 30. On July 31, Elsinore sighted (but did not catch) 4 bluefin schools. On August 1, Elsinore switched to fishing yellowfin and skipjack in warmer waters to the south near Thetis Bank until the bluefin reappeared in appreciable numbers to the north off San Diego on August 6.

As the bluefin fleet reassembled again between August 6 and 10 about 80-90 miles west of Cape San Quentin, releases 3-12 and their recoveries subsequently indicated a general northward trend of movement, except for release group 10, tagged near the 43-fathom spot (Thirtymile Bank) off San Diego. This group moved southward. Averages for groups 3-12 ranged from 14 to 33 days at liberty and movements varied from 4 to 85 miles (table 1).

Bluefin tuna-tagging operations have been continued in 1964. To date, 958 bluefin have been tagged and released in the offshore region extending from Cedros Island northward to San Clemente Island. All fishermen are urged to report bluefin tuna tag recoveries as promptly as possible to the Bureau of Commercial Fisheries Biological Laboratory, San Diego, or to the California Department of Fish and Game, Terminal Island, California.

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1963. Cooperative bluefin tuna tagging program - a preliminary report. U.S. Bureau of Commercial Fisheries, Calif. Fishery Market News Monthly Summary, March, 1963. Part II - Fishing Information, pp. 1-6.

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ORANGE, CRAIG J. AND BERNARD D. FINK.
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SEA SURFACE TEMPERATURE CHARTS, EASTERN PACIFIC OCEAN

AUGUST 1964

Acknowledgments

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U.S. Weather Bureau, San Diego, California
U.S. Naval Communication Station Balboa, Fort Amador, Canal Zone
U.S. Weather Bureau Port Meteorological Office, Cristobal, Canal Zone
California Department of Fish and Game R/V Alaska
Guadalupe Island, Coronado Island, Ensenada, Cedros Island and Almejas Bay by Pedro Mercado of the Universidad Autonoma de Baja California, Ensenada, Mexico
Hopkins Marine Station, Pacific Grove, California by J. P. Balesteri
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Kelco Company, San Diego, California
Lifeguard Headquarters, Newport Beach, California
Pacific Oceanographic Group, Nanaimo, British Columbia, by H. J. Hollister from observations by R. Collins at Quatsino Lightstation; T. Quon at Cape St. James Light; R. Stuart at Amphitrite Point Light; W. E. Redlac at Langara Island Light
Scripps Institution of Oceanography, La Jolla, California by Margaret Robinson and Hans Klein
Ships Monsoon, Santa Maria and West Point

Charts

Figure 1.--Mean sea surface temperatures (°F) derived from approximately 8000 observations. Squares show temperatures at weather-ship stations. Numerals on shore are temperatures at coastal and light-ship stations.

Figure 2.--Deviation of sea surface temperatures (°F) from long term charts of H.O. 225. Hatched areas are colder than mean.

Figure 3.--Deviation of sea surface temperatures (°F) from those of August 1963. Hatched areas are colder than 1963.

Figure 4.--Sea surface temperatures (°F) by 1-degree squares, approximately 2000 observations. Line under temperatures indicates average of two or more observations. Numerals on shore are temperatures at coastal stations.

Figure 5.--Deviation of sea surface temperatures (°F) August 1964-August 1963 by 1-degree squares. Shaded areas are colder than 1963.

Figure 6.--Deviation of sea surface temperatures (°F) from 12-year mean (1947-1958) by 2-degree squares. Shaded areas are colder than 1963.

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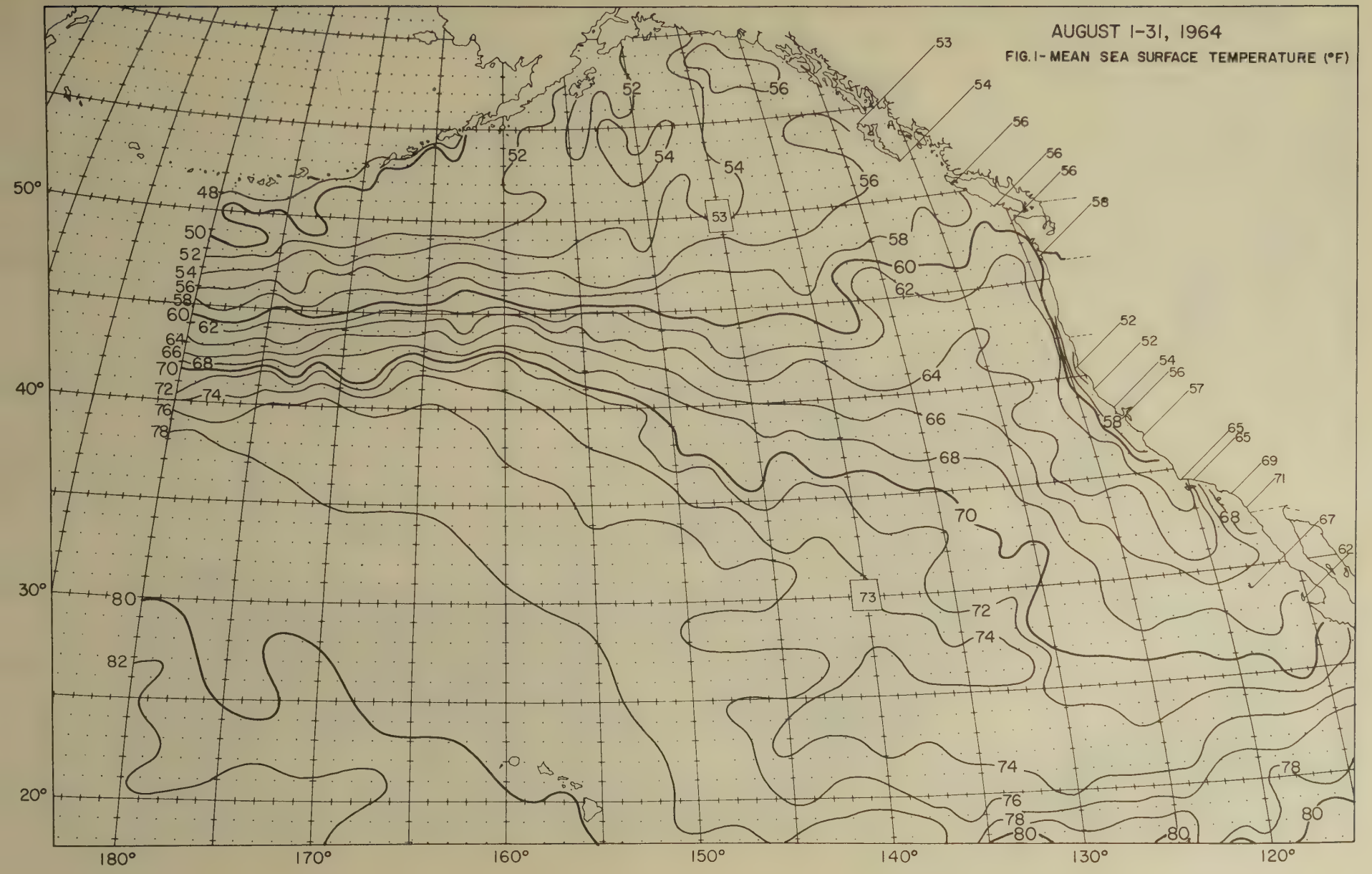
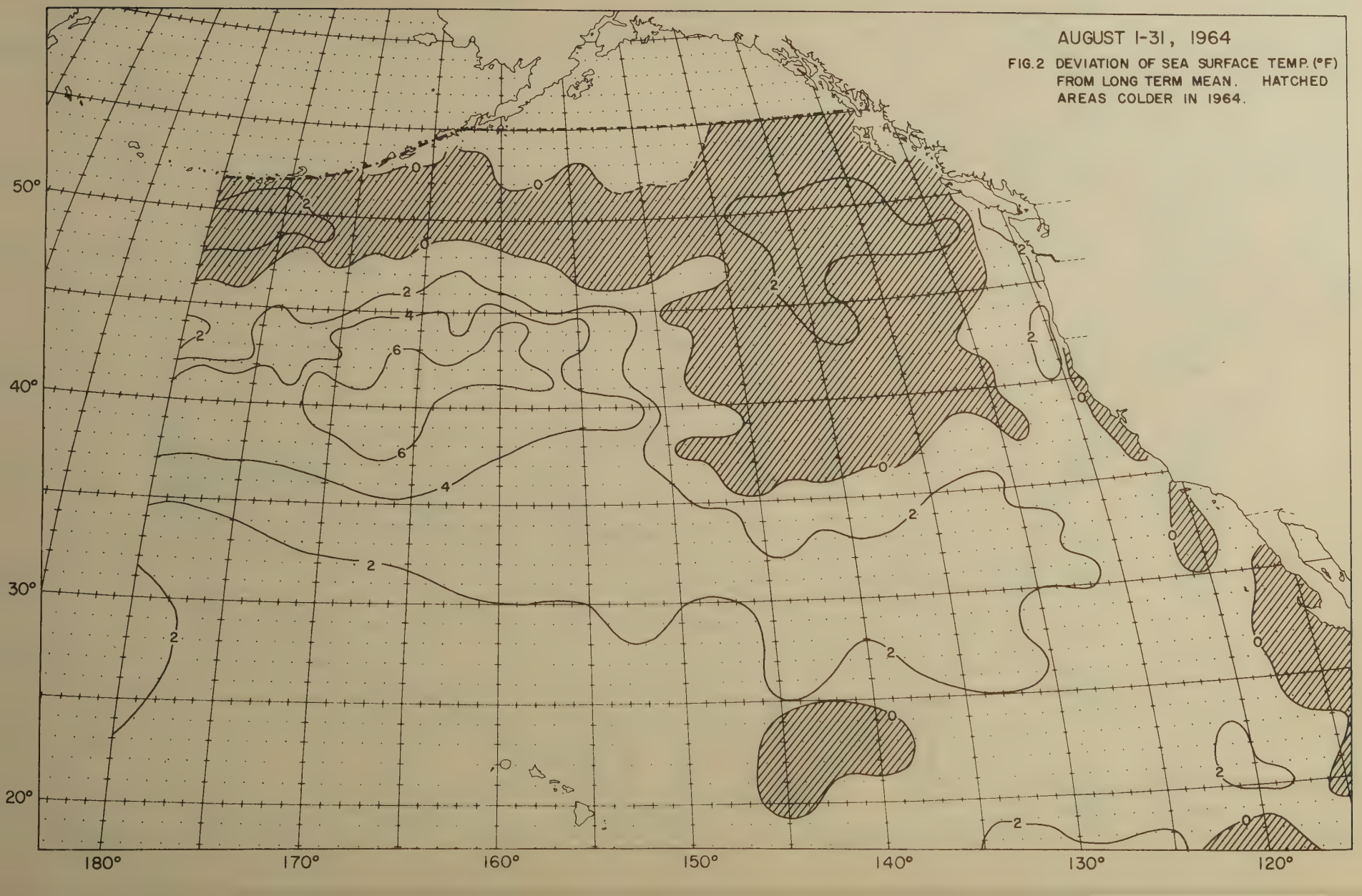
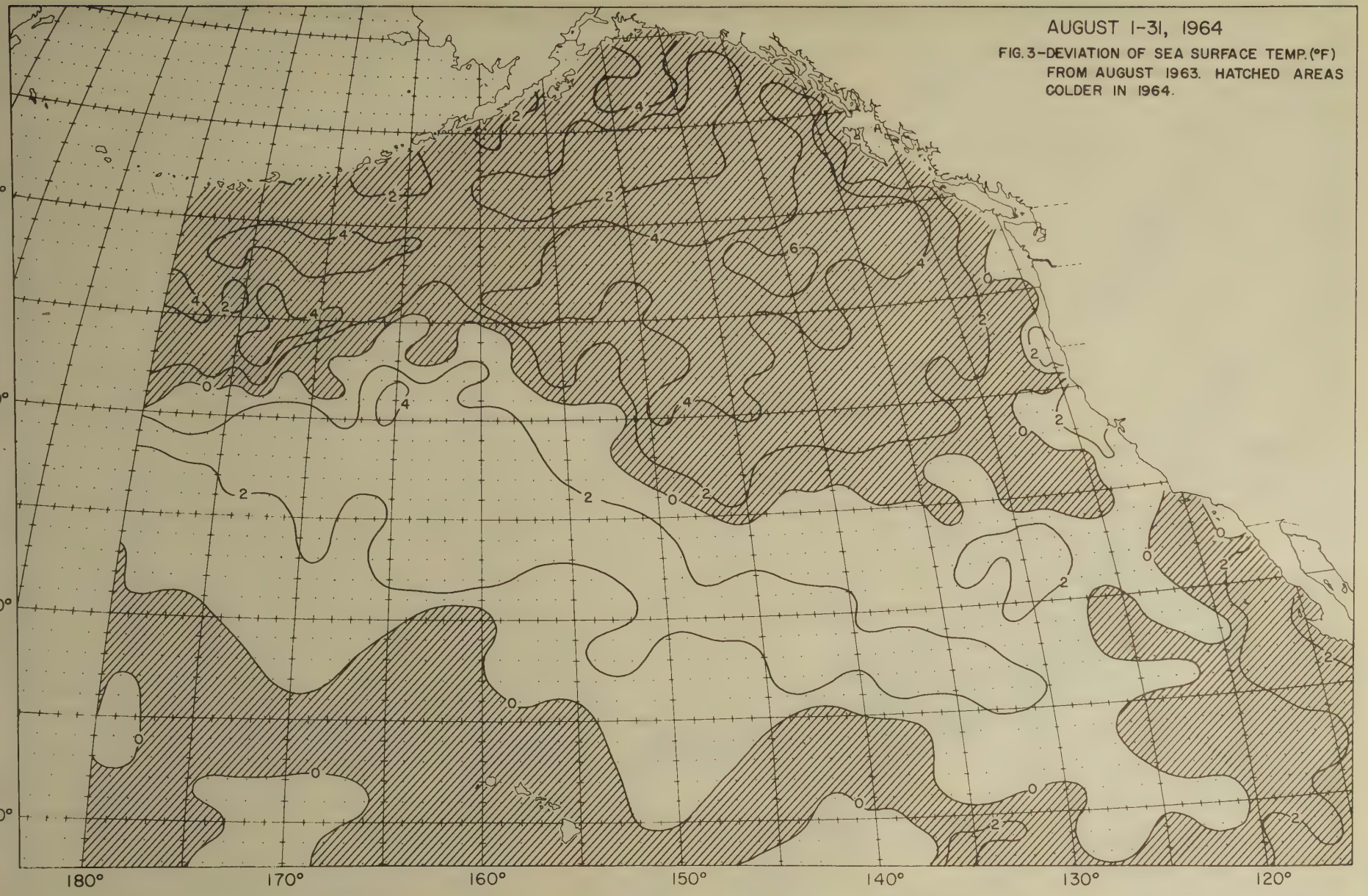
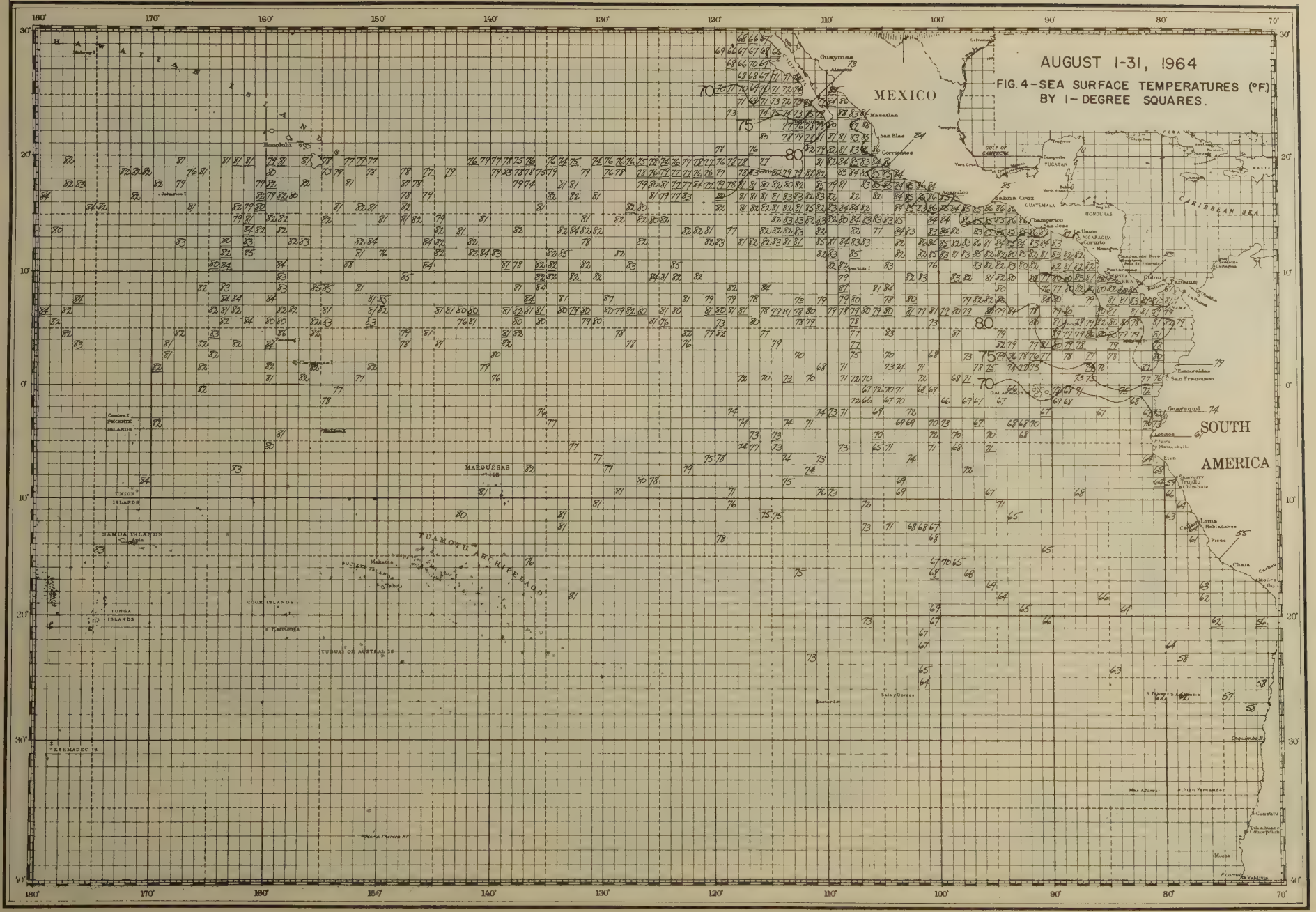
Fishery Biologist (General)


AUGUST 1-31, 1964
FIG. 1- MEAN SEA SURFACE TEMPERATURE (°F)
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°
53
73


AUGUST 1-31, 1964
FIG.2 DEVIATION OF SEA SURFACE TEMP. (°F) FROM LONG TERM MEAN. HATCHED AREAS COLDER IN 1964.
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°


AUGUST 1-31, 1964
FIG. 3-DEVIATION OF SEA SURFACE TEMP. (°F) FROM AUGUST 1963. HATCHED AREAS COLDER IN 1964.
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°


AUGUST 1-31, 1964
FIG. 4 - SEA SURFACE TEMPERATURES (°F) BY 1 - DEGREE SQUARES.
MEXICO
SOUTH AMERICA
CARIBBEAN SEA
HAWAIIAN ISLANDS
PHOENIX ISLANDS
LINE ISLANDS
MARQUESAS
SOCIETY ISLANDS
TUAMOTU ARCHIPELAGO
COOK ISLANDS
SAMOA ISLANDS
TONGA ISLANDS
TUBUAI OR AUSTRAL IS.
KERMADEC IS.
GALAPAGOS IS.
Guayaquil
Lima
Callao
Salina Cruz
Acapulco
Manzanillo
Mazatlan
San Blas
Guaymas
Honolulu
Tahiti
Rarotonga
Pisco
Chala
Mollendo
Ilo
Arica
Iquique
Tocopilla
Antofagasta
Coquimbo
Valparaiso
Juan Fernandez
Mas A Fuera
Easter I.
Salas y Gomez
Nassau
Panama
Colon
Puntarenas
Limon
Corinto
Managua
Guatemala
Honduras
Belize
Yucatan
Campeche
Veracruz
Tampico
Progreso
Cuba
Haiti
Jamaica
Galveston
Esmeraldas
San Francisco
Tumbes
Talara
Paita
Chimbote
Callao
Pisco
Mollendo
Arica
Iquique
Tocopilla
Antofagasta
Coquimbo
Valparaiso
Juan Fernandez
Mas A Fuera
Easter I.
Salas y Gomez
Nassau
Panama
Colon
Puntarenas
Limon
Corinto
Managua
Guatemala
Honduras
Belize
Yucatan
Campeche
Veracruz
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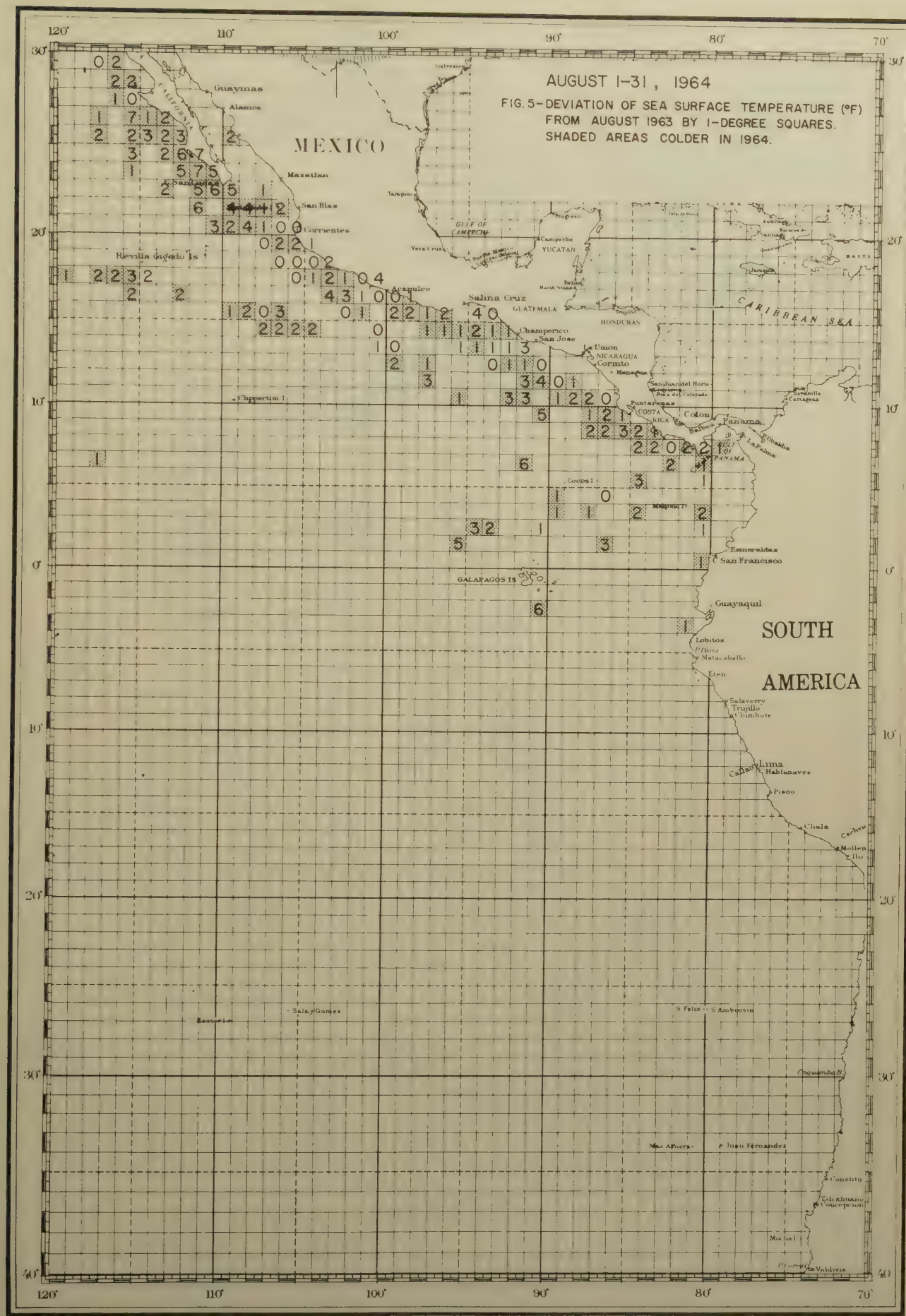
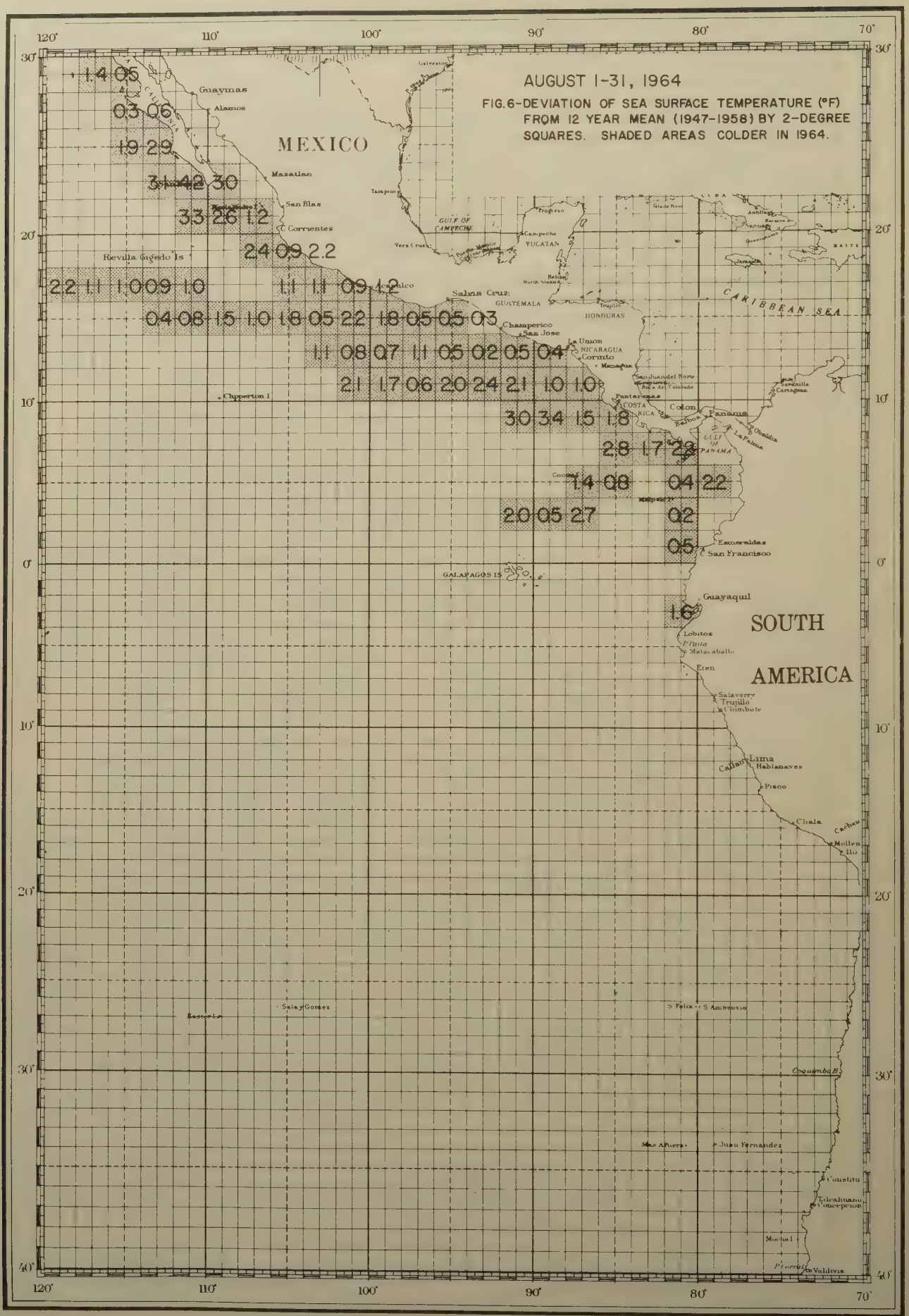
Esmeraldas
San Francisco
Tumbes
Talara
Paita
Chimbote


AUGUST 1-31, 1964
FIG. 5-DEVIATION OF SEA SURFACE TEMPERATURE (°F) FROM AUGUST 1963 BY 1-DEGREE SQUARES. SHADED AREAS COLDER IN 1964.
MEXICO
GUATEMALA
HONDURAS
NICARAGUA
COSTA RICA
PANAMA
CARIBBEAN SEA
GULF OF CAMPECHE
YUCATAN
SOUTH AMERICA
GALAPAGOS IS
Guaymas
Alamos
Mazatlan
San Blas
Corrientes
Revilla Gigedo Is
Acapulco
Salina Cruz
Champerico
San Jose
Corinto
Punta Arenas
Colon
Panama
Esmeraldas
San Francisco
Guayaquil
Lobitos
Eten
Salaverry
Trujillo
Chimbote
Lima
Callao
Pisco
Chala
Cocharcas
Mollendo
Arica
Iquique
Antofagasta
Coquimbo
Valparaiso
Talcahuano
Corral
Valdivia
Juan Fernandez
S Felix
S Ambrosio
Sala y Gomez
Easter I
Clipperton I
Cocos I
Malpelo I


AUGUST 1-31, 1964
FIG.6-DEVIATION OF SEA SURFACE TEMPERATURE (°F) FROM 12 YEAR MEAN (1947-1958) BY 2-DEGREE SQUARES. SHADED AREAS COLDER IN 1964.
MEXICO
SOUTH AMERICA
CARIBBEAN SEA
GULF OF CAMPECHE
GULF OF PANAMA
GALAPAGOS IS
Guaymas
Alamos
Mazatlan
San Blas
Corrientes
Revilla Gigedo Is
Salina Cruz
GUATEMALA
HONDURAS
Champerico
San Jose
Corinto
NICARAGUA
Managua
Punta Arenas
COSTA RICA
Colon
Panama
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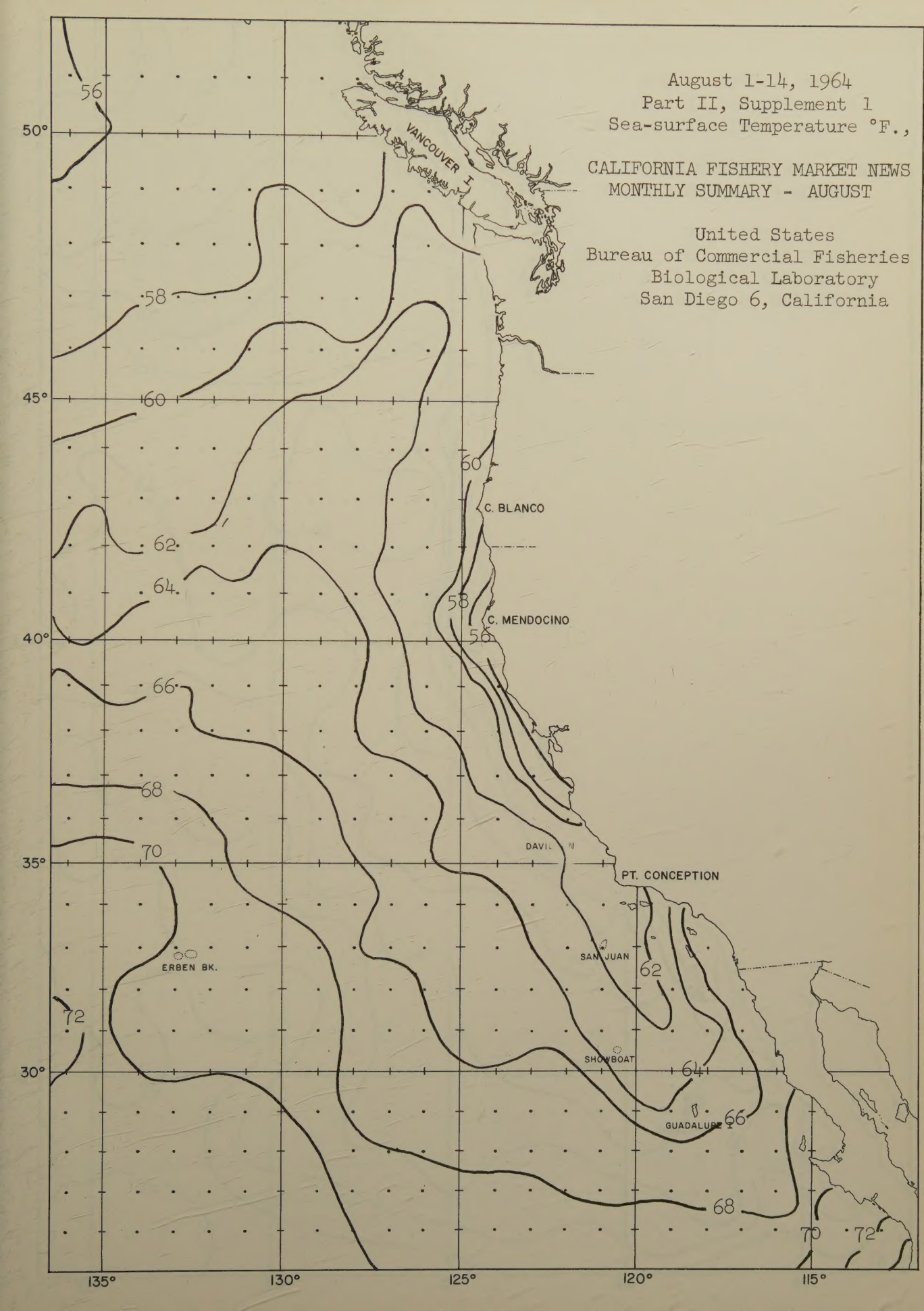
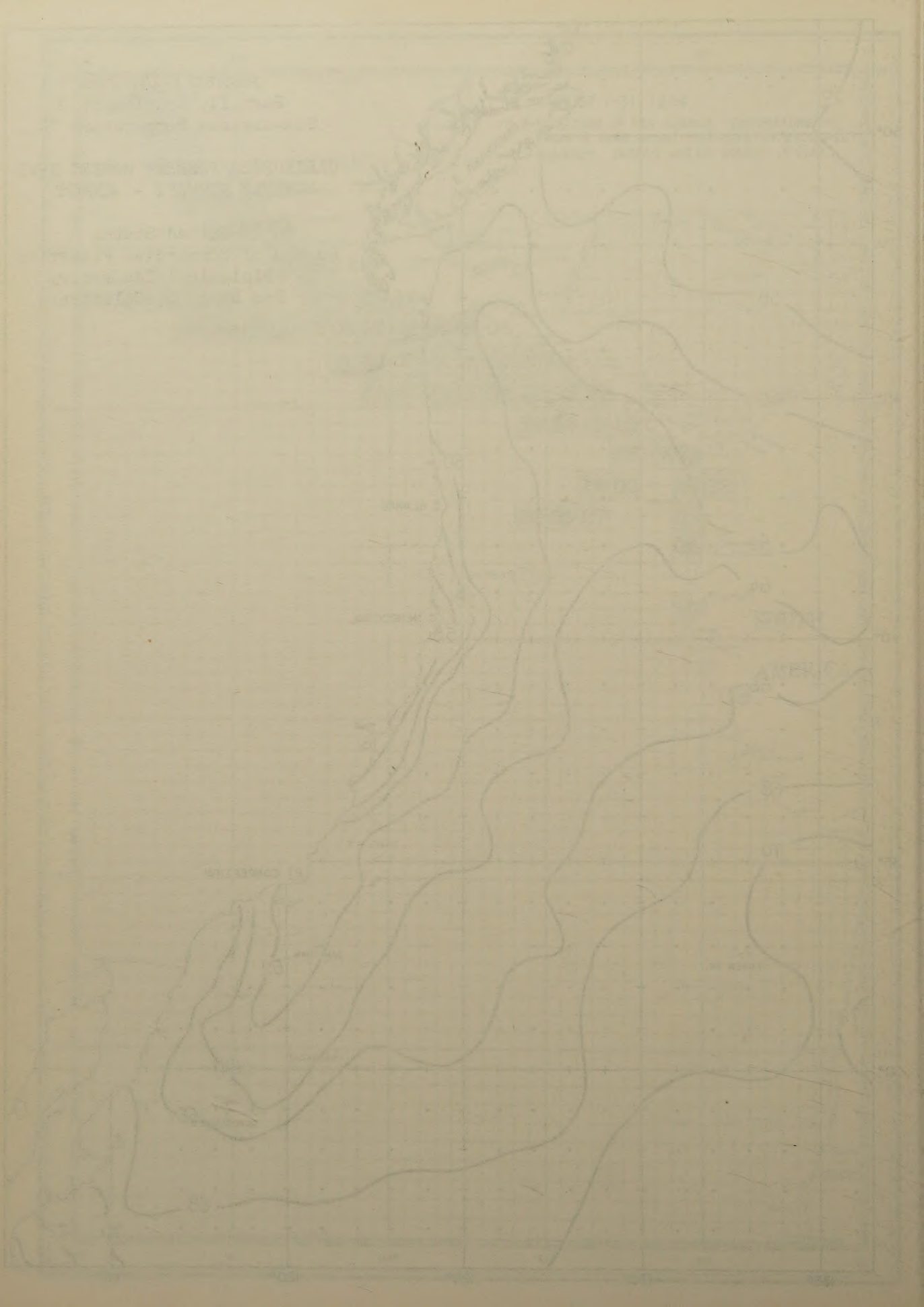
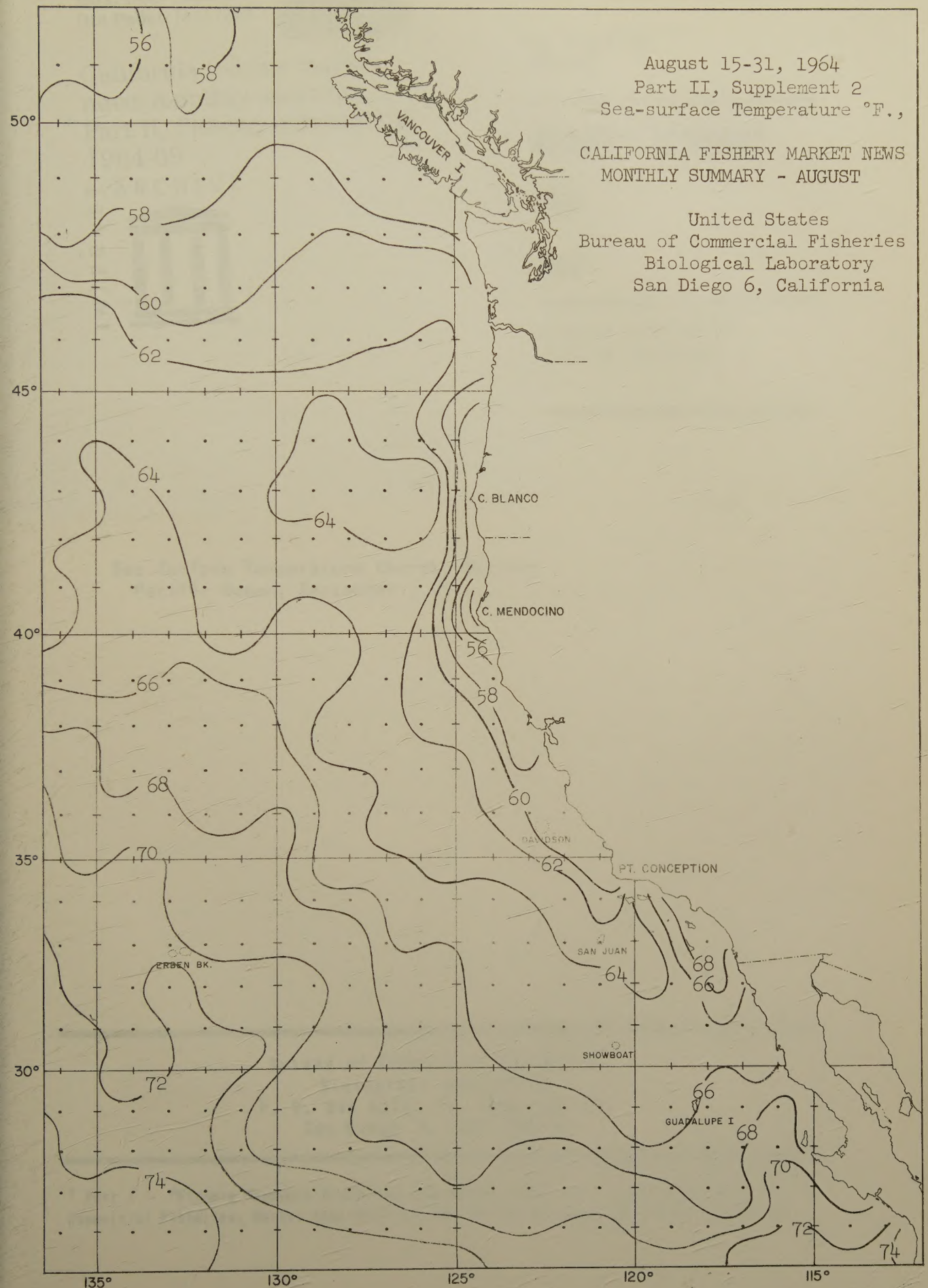
Chimbote
Lima
Callao
Pisco
Chala
Cachau
Mollendo
Arica
Iquique
Antofagasta
Juan Fernandez
Valdivia
Corral
Coquimbo
Caldera
Chiloe I
Mocha I
S Felix
S Ambrosio
Easter I
Sala y Gomez
Chuperton I
Progreso
Campeche
YUCATAN
Tampico
Galveston
Belize
Jamaica
HAITI
Aruba
Curacao
Maracaibo
Puerto Cabello
La Guaira
Barranquilla
Cartagena
Bahia Honda
Balboa
Taboga I
Las Palmas
Otoque I
Puerto Pizarro
Paita
Matacaballo
Callao
Lima
Habla naves
Pisco
Chala
Cachau
Mollendo
Arica
Iquique
Antofagasta
Juan Fernandez
Valdivia
Corral
Coquimbo
Caldera
Chiloe I
Mocha I
S Felix
S Ambrosio
Easter I
Sala y Gomez
Chuperton I
Progreso
Campeche
YUCATAN
Tampico
Galveston
Belize
Jamaica
HAITI
Aruba
Curacao
Maracaibo
Puerto Cabello
La Guaira
Barranquilla
Cartagena
Bahia Honda
Balboa
Taboga I
Las Palmas
Otoque I
Puerto Pizarro
Paita
Matacaballo
Eten
Salaverry
Trujillo
Chimbote
Lobitos
Guayaquil
Esmeraldas
San Francisco
Cocos I
Panama
Colon
COSTA RICA
Punta Arenas
Corinto
NICARAGUA
Managua
San Jose
Champerico
Salina Cruz
GUATEMALA
HONDURAS
Revilla Gigedo Is
San Blas
Corrientes
Mazatlan
Alamos
Guaymas
GULF OF CAMPECHE
GULF OF PANAMA
GALAPAGOS IS
CARIBBEAN SEA
MEXICO
SOUTH AMERICA
AUGUST 1-31, 1964
FIG.6-DEVIATION OF SEA SURFACE TEMPERATURE (°F) FROM 12 YEAR MEAN (1947-1958) BY 2-DEGREE SQUARES. SHADED AREAS COLDER IN 1964.
120°
110°
100°
90°
80°
70°
30°
20°
10°
0°
40°


August 1-14, 1964
Part II, Supplement 1
Sea-surface Temperature °F.,
CALIFORNIA FISHERY MARKET NEWS
MONTHLY SUMMARY - AUGUST
United States
Bureau of Commercial Fisheries
Biological Laboratory
San Diego 6, California
VANCOUVER I.
C. BLANCO
C. MENDOCINO
PT. CONCEPTION
SAN JUAN
ERBEN BK.
SHOWBOAT
GUADALUPE I.
56
58
60
62
64
66
68
70
72
50°
45°
40°
35°
30°
135°
130°
125°
120°
115°




August 15-31, 1964
Part II, Supplement 2
Sea-surface Temperature °F.,
CALIFORNIA FISHERY MARKET NEWS
MONTHLY SUMMARY - AUGUST
United States
Bureau of Commercial Fisheries
Biological Laboratory
San Diego 6, California
VANCOUVER I.
C. BLANCO
C. MENDOCINO
PT. CONCEPTION
DAVIDSON
SAN JUAN
SHOWBOAT
GUADALUPE I
ERBEN BK.
56
58
60
62
64
66
68
70
72
74
50°
45°
40°
35°
30°
135°
130°
125°
120°
115°